

Executive Summary and Implementation

Establishment of Wildflower Islands to Enhance Roadside Health and Aesthetics

Research Objectives

- Determine how establishment of wildflower islands impact cover and density of wildflowers and associated floral resources, and plant species composition and diversity of roadside grasslands;
- Evaluate the attractiveness of newly established wildflower mixtures to wild and managed bees by monitoring bee visitations, identifying plant-pollinator interactions, and assessing the diversity and abundance of wildflowers present in bee-collected pollen; and
- Assess potential impacts of newly established wildflowers on bee health as well as establishment of wild bee communities before and after wildflower planting.

Research Benefits

- Assess seeding methods on wildflower establishment;
- Assess attractiveness of wildflower mixtures on bee pollinators; and
- Assess impact of wildflower islands on bee health and establishment.

Principal Investigators

**Walter Schacht (P.I.) and
Judy Wu-Smart (Co P.I.)**
University of Nebraska

Lead TAC Member

Carol E. Wienhold

Background

Wildflowers are crucial in the ecological function of the low-input roadside plant communities in terms of water and nutrient cycling, nutrient inputs such as nitrogen, total plant canopy cover, stand longevity, and provision of habitat for numerous small animals. Further, wildflowers provide critical foraging and nesting resources for birds, insects, and other wildlife. Unfortunately, habitat loss from agricultural and urban development has led to rapid population declines in wild bees and other pollinators across the US, thereby jeopardizing not only food production but also the sustainability of our natural landscapes (Kearns & Inouye, 1997). One way to mitigate wild bee decline is to establish more habitat corridors on public rights-of-way, such as roadsides. Planting pollinator-friendly native wildflowers on roadsides provides nutrient-rich forage and nesting resources for bees and is aesthetically pleasing. With 97,256 miles of public roadways in Nebraska (~4 million miles of roadways in the United States), roadsides play ever increasing roles in sustaining biodiversity within our state and beyond.

Proposed Implementation by the Principal Investigator

Two new construction sites each with a minimum length of 2.5 miles are needed for this study. Four seeding treatments for establishing wildflowers into roadsides will be compared: 1) the entire backslope seeded to the Type A seeding mixture using the conventional seeding practices; 2) 75% of backslope seeded as described in treatment 1 and 25% of area seeded in a strip to a pollinator mixture of wildflowers; 3) 50% of backslope seeded as described in treatment 1 and 50% of area seeded in a strip to a pollinator mixture of wildflowers; and 4) the entire backslope seeded to a pollinator mixture of wildflowers. Each strategy will be replicated three times for a total of nine plots (experimental units) at each site. Plots will measure about 23 feet wide 164 feet long along the backslope, and the plots will be separated by a seeded buffer of about 825 feet. Plots will be seeded in April 2017 by a NDOR-approved contractor using a seed drill.

Conclusion

Conventional roadside seeding methods yielded plots with lower abundance and richness of forbs and bees compared to plots seeded with wildflowers only (treatments 100, 50, 25x2) but only in the first year of establishment. Bee richness was highest in the late season, while forb abundance and richness were highest in the mid-season. No differences were observed across differently sized wildflower-only patches likely because of the recent establishment of plots. In fact, only ~50% of seeded forbs had established and roughly 14 plants out of the 40 species in the seed mixture did not establish in either survey years and may therefore be replaced in future seed mixtures. Our results indicate that wildflower segregation in strips or islands may be a cost-effective method of improving wildflower establishment and persistence in diverse roadside mixtures. As plots mature and become vulnerable to weed encroachment, the effect of patch size may become more distinguished across treatment groups, therefore, further monitoring and research may be necessary to further address issues with low establishment and high competitive pressure from volunteer species. These data contribute to NDOT's ongoing pursuit to more effectively establish wildflowers on roadsides and to better understand that role floral enhancements have on supporting and sustaining vulnerable wildlife, such as our pollinator communities.

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Quote:

"We were able to show that increases in forb abundance and richness directly promoted bee abundance and nesting in wildflower seeded plots." By P.I. and Co P.I.

Recommendations for Implementation

As NDOT moves into Phase 2 of this research topic, the study's findings will be used in shaping the next wildflower and pollinator trials.

Interested in finding out more?

Final report is available at:

[NDOT Research Website](#)

**This brief summarizes Project SPR-1 (17) M058
"Establishment of Wildflower Islands to Enhance Roadside Health and Aesthetics"
Nebraska Department of Transportation Research Program**